

# 5E Lesson Plan

## Equivalent Fractions

**teachHOUSTON** Student Name:

Mentor Teacher Name:

Grade Level: 4<sup>th</sup>

Lesson Teaching Date and Time:

**Concept(s):** Identifying and generating equivalent fractions is key to the conceptual development of students' understanding of fractions. These skills are also a prerequisite to adding and subtracting fractions with unlike denominators.

**TEKS:** The student is expected to:  
4.2.A Use concrete objects and pictorial models to generate equivalent fractions.

Objective The student will be able to:	Evaluation Questions for each Objective
1. Define and describe equivalent fractions	1. Describe in your own words what it means for two fractions to be equivalent.
2. Generate equivalent fractions	2. List 3 fractions that are equivalent to $\frac{2}{5}$ .
3. Identify if two fractions are equivalent	3. Are the following fractions equivalent? Describe how you know. $\frac{3}{7} \stackrel{?}{=} \frac{6}{21}$

### Materials List

For the teacher:

- “What Does Equivalent Mean?” transparency

For each student:

- “Equivalent Fractions” Activity Sheet
- Evaluation
- Set of fraction bars (for every 2 students)

For each group of students:

- One set of “Memory cards”

Advanced Preparations:

- Make copies of evaluation and other hand-outs

- Make copies of “Memory” cards and cut apart; you may wish to print the game cards on cardstock or laminate them.

ENGAGEMENT		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
The teacher will display the “What Does Equivalent Mean?” transparency on the overhead. Cover the bottom half of the transparency so students can only see the top half of the transparency.	<p>What do you think the word “equivalent” mean? <i>Same</i> <i>Equal</i></p> <p>Are two groups of coins shown here the same? Why? <i>They are not the same because there are dimes and pennies on the left while on the right side are quarters and nickels.</i> <i>They are the same because they both equal 35 cents.</i></p> <p>We can say these two groups of coins are equivalent. What does equivalent mean? Be specific. If two things are equivalent they have the same value but are not identical.</p>	The students will brainstorm the meaning of equivalent.
The teacher will show the bottom half of the transparency.	<p>What coins could I place on the right side so they would be equal to these 2 quarters? <i>two quarters</i></p> <p>What coins could I place on the right side so they would be equivalent to these 2 quarters? <i>five dimes, 10 nickels, one quarter and five nickels, etc.</i></p>	<p>In pairs, students will discuss what combination of coins are equivalent to two quarters.</p> <p>Selected students will share their answers. The remaining students will confirm whether the answers presented are equivalent and why.</p>

## TRANSITION

In this activity we investigated how two sets of coins could be equivalent but not equal. In the next activity we are going to apply these same ideas to fractions. We will identify

fractions that are equivalent (cover the same area) but are not equal.

EXPLORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
The teacher will ask students to separate the fraction bars by color and look for similarities among the fraction bars of the same color.	<p>What is the same about all the yellow fraction bars? <i>All the yellow fraction bars represent thirds.</i></p> <p>What is the same about all the red fraction bars? <i>All the red fraction bars represent sixths.</i></p>	Students will separate the fraction bars by color and look for similarities among the fraction bars of the same color.
<p>The teacher will model how to use the fraction bars to find equivalent fractions using <math>\frac{1}{2}</math> as an example.</p> <p>The teacher will shade one-half of a fraction bar. Then the teacher will look for equivalent fractions in each of the color stacks. She will investigate the thirds, fourths, fifths, sixths, etc.</p>	<p>Look at the 3 equivalent fractions we have written down: <math>\frac{1}{2}, \frac{2}{4}, \frac{3}{6}</math>. What patterns do you see among the fractions?</p> <p><i>-The numerators count by 1's and the denominators count by 2's.</i></p> <p><i>-There is a common factor between the numerators and the denominators. For example, 3 is three times bigger than 1 and 6 is three times bigger than 2.</i></p> <p>Without using your fraction bars, tell me some more fractions that are equivalent to <math>\frac{1}{2}</math>. <math>\frac{1}{2} = \frac{4}{8}, \frac{5}{10}, \frac{10}{20}, \frac{50}{100}</math></p> <p>Is <math>\frac{35}{70}</math> equivalent to <math>\frac{1}{2}</math>? Why or why not? <i>-Yes, because like all the other fractions that are equivalent to <math>\frac{1}{2}</math> the denominator is twice as big as the numerator.</i> <i>-Yes because 1 times 35 is 35 and 2 times 35 is 70.</i></p>	<p>Students will use their fraction bars to make fractions that are equivalent to <math>\frac{1}{2}</math> with the guidance of the teacher. Students will record their fractions on their worksheet.</p> <p>Students will use the patterns they have found to try to find other fractions equivalent to <math>\frac{1}{2}</math> without using the fraction bars.</p>

**TRANSITION STATEMENT**

You have done a good job of finding fraction bars that represent equivalent amounts and looking for patterns in your equivalent fractions. Now you will have an opportunity to share your results with your classmates.

**EXPLANATION****What the Teacher Will Do**

The teacher will select students to share the results of their exploration. Be intentional about who you choose to share; look for students who have found interesting and unique patterns as well as students with common misconceptions that need to be addressed with the entire class.

**Eliciting Questions/  
Student Responses**

What fractions did you find that were equivalent to  $\frac{2}{3}$ ?

$$\frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$$

What patterns did you see in the equivalent fractions?

*-The numerators count by 2's and the denominators count by 3's.*

*--There is a common factor between the numerators and the denominators. For example, 6 is three times bigger than 2 and 9 is three times bigger than 3.*

Without using your fraction bars, tell me some more fractions that are equivalent to  $\frac{2}{3}$ . How did you obtain these fractions?

$$\frac{8}{12}, \frac{10}{15}, \frac{20}{30}, \frac{60}{90}$$

Is  $\frac{14}{21}$  equivalent to  $\frac{2}{3}$ ?

Why or why not?

*-Yes because both the numerator and denominator of  $\frac{14}{21}$  are related by a factor of 7 to the original numerator and denominator*

**What the Students Will Do**

Selected students will share the results of the exploration.

	<p>of <math>\frac{2}{3}</math>.</p> <p>Continue using the same questions to explore fractions equivalent to <math>\frac{1}{4}</math> &amp; <math>\frac{3}{4}</math>.</p>	
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### TRANSITION STATEMENT

In the last activity you created your own equivalent fractions with fraction bars. There are other ways to represent equivalent fractions such as with fraction circles. In this next activity you will match three representations (common fractions, fraction circles, fraction bars) of equivalent fractions. Then you will play the game “Memory” to practice identifying whether or not two fractions are equivalent.

### ELABORATION

What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
<p>The teacher will hand out a set of “Equivalent Fractions” cards and explain the directions.</p> <p><i>“Shuffle the 48 cards and deal the cards to each of the four members of your team. Each person should have 12 cards. Your group is to match different representations of equivalent fractions. Each unique fractions is represented by two common equivalent fractions, two fraction bars, and two fraction circles (six cards total). You are to find all eight sets.</i></p>	<p>Which cards are equivalent to <math>\frac{2}{3}</math>? How do you know?</p> <p><i>Common fractions:</i> <math>\frac{6}{9}</math>, <math>\frac{16}{24}</math></p> <p><i>Fraction circle:</i> <math>\frac{2}{3}</math>, <math>\frac{4}{6}</math></p> <p><i>Fraction bars:</i> <math>\frac{4}{6}</math>, <math>\frac{8}{12}</math></p> <p>Why does the fraction circle representing <math>\frac{4}{6}</math> look different from the fraction bar representing the same value?</p> <p>What strategy did you use to identify all six cards that represent <math>\frac{2}{3}</math>?</p>	<p>Students will match representations of equivalent fractions. Each fraction is represented in 6 different forms. Students will find all eight sets.</p>

<p>The teacher will explain the rules for playing “Memory”.  <i>”Select four complete sets of fraction cards (the ones from the previous activity). You should have 24 cards. Shuffle the cards and lay them out in a 4 x 6 grid. Player 1 turns over two cards. If they match (represent equivalent fractions), then Player 1 keeps the two cards. If they do not match, then Player 1 turns the cards face down and leaves them in the 4 x 6 grid. Then Player 2 turns over two cards. New cards or some of the already shown cards may be chosen. Likewise, if the cards match, Player 2 keeps the cards. If the cards do not match, then Player 2 turns the cards face down and leaves them on the grid. Play continues until all cards are matched. The player with the most matching pairs is the winner.”</i></p> <p><i>The teacher monitors students as they play “Memory.” The teacher will observe the matches made by students to ensure correctness and identify any misconceptions.</i></p> <p>After students have finished the game, the teacher will select some students to share one of their matches and tell how they knew it was equivalent.</p>	<p>How did you know these 2 fractions were a match?  <i>-The fractions have the same value (cover the same area) because if you color in <math>\frac{1}{2}</math> of a circle it is the same amount as if you color in <math>\frac{2}{4}</math> of a circle.</i>  <i>-I know <math>\frac{2}{4}</math> is equivalent to <math>\frac{1}{2}</math> because 2 is twice as big as 1 and 4 is twice as big as 2.</i></p> <p>Give me an example of two fractions that are not equivalent. How do you know they are not equivalent? <math>\frac{1}{2}</math> is not equivalent to <math>\frac{1}{3}</math> because they do not have the same value. <math>\frac{1}{2}</math> is more than <math>\frac{1}{3}</math>.</p>	<p>Students will play the game “Memory” in groups of 4. Students lay all cards face down in rows on a desk or table. On each student’s turn, he or she will turn over any 2 cards. If the fractions represented on the cards are equivalent, then they are a match and the student keeps the cards.</p> <p>The student will tell how he or she knows the fractions are equivalent. The other 3 players will confirm that the 2 cards are equivalent. If the 2 cards are not equivalent, the student leaves the cards in place and turns them face down again. Play continues until all the cards have been matched. The player with the most matches wins.</p> <p>Students will share their matches and explain how they knew the fractions are equivalent.</p>
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**TRANSITION**

You have created your own equivalent fractions and you have played a game in which you had to determine if fractions were equivalent. Now you will have an opportunity to show what you have learned.

## EVALUATION

1. Describe in your own words what it means for two fractions to be equivalent.
2. List three fractions that equivalent to  $\frac{2}{5}$ .
3. Are the following fractions equivalent? Describe how you know.

$$\frac{3}{7}$$

$$\frac{6}{21}$$



# What Does Equivalent Mean?



Name \_\_\_\_\_

Date \_\_\_\_\_

## Equivalent Fractions Activity Sheet

1. Use your fraction bars to find two fractions that have the same value as  $\frac{1}{2}$ . Draw your equivalent fractions and list them in the space provided.



$$\frac{1}{2}$$

\_\_\_\_\_

\_\_\_\_\_

2. What patterns do you notice in your equivalent fractions?

3. Use the patterns you see to write down two more fractions you think are equivalent to  $\frac{1}{2}$ .

\_\_\_\_\_

\_\_\_\_\_

4. Use your fraction bars to find two fractions that have the same value as  $\frac{2}{3}$ . Draw your equivalent fractions and list them in the space provided.



$$\frac{2}{3}$$

\_\_\_\_\_

\_\_\_\_\_

5. What patterns do you notice in your equivalent fractions?

6. Use the patterns you see to write down two more fractions you think are equivalent to  $\frac{2}{3}$ .

7. Use your fraction bars to find two fractions that have the same value as  $\frac{1}{4}$ . Draw your equivalent fractions and list them in the space provided.



$$\frac{1}{4}$$

8. What patterns do you notice in your equivalent fractions?

9. Use the patterns you see to write down two more fractions you think are equivalent to  $\frac{1}{4}$ .

10. Use your fraction bars to find two fractions that have the same value as  $\frac{3}{5}$ . Draw your equivalent fractions and list them in the space provided.



$$\frac{3}{5}$$

11. What patterns do you notice in your equivalent fractions?

12. Use the patterns you see to write down two more fractions you think are equivalent to  $\frac{3}{5}$ .

# Equivalent Fractions Activity Sheet

1. Sketch  $\frac{1}{2}$ . Then sketch additional fractions that are equivalent to  $\frac{1}{2}$ .

2. Make a table of values of the equivalent fractions you identified in Question #1.

Numerator	1							
Denominator	2							

3. What patterns do you notice in your equivalent fractions?

4. Sketch  $\frac{2}{3}$ . Then sketch additional fractions that are equivalent to  $\frac{2}{3}$ .



5. Make a table of values of the equivalent fractions you identified in Question #3.

Numerator	2							
Denominator	3							

6. What patterns do you notice in your equivalent fractions?

7. Sketch  $\frac{1}{4}$ . Then sketch additional fractions that are equivalent to  $\frac{1}{4}$ .

8. Make a table of values of the equivalent fractions you identified in Question #5.

Numerator	1							
Denominator	4							

9. What patterns do you notice in your equivalent fractions?

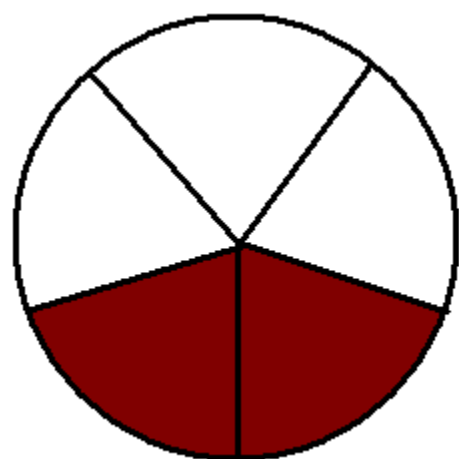
10. Sketch  $\frac{3}{5}$ . Then sketch additional fractions that are equivalent to  $\frac{3}{5}$ .

11. Make a table of values of the equivalent fractions you identified in Question #7.

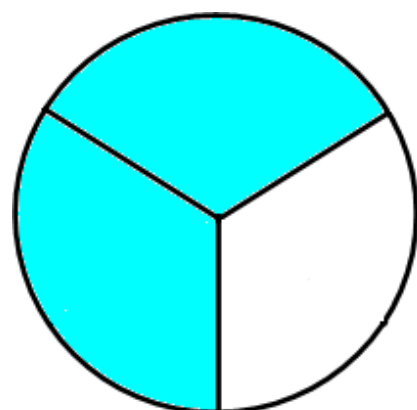
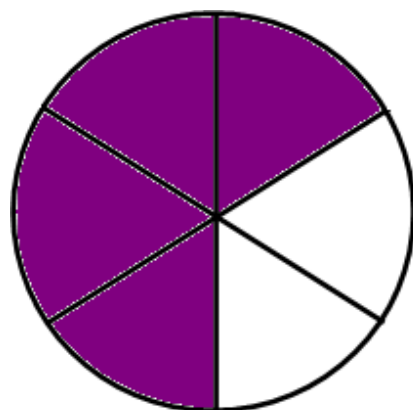
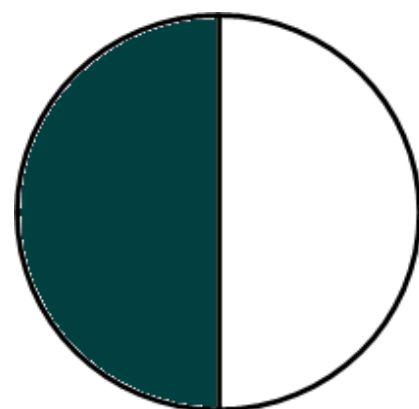
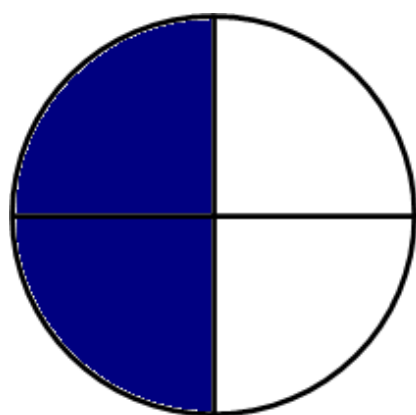
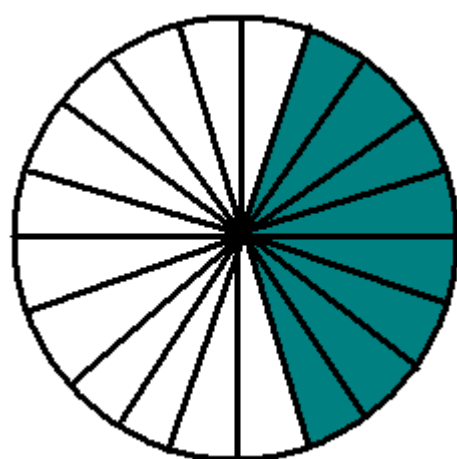
Numerator	3							
Denominator	5							

12. What patterns do you notice in your equivalent fractions?

$$\frac{6}{15}$$



$$\frac{18}{45}$$



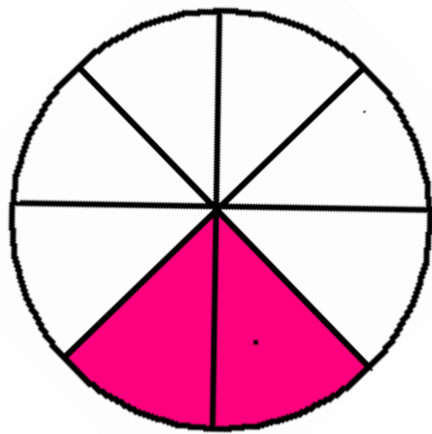
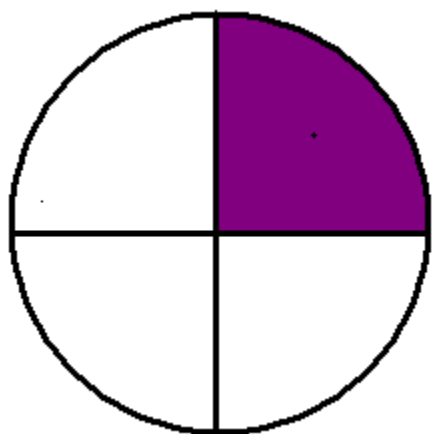
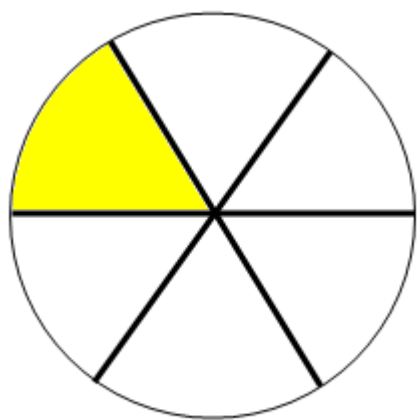


$$\frac{3}{6}$$

$$\frac{17}{34}$$

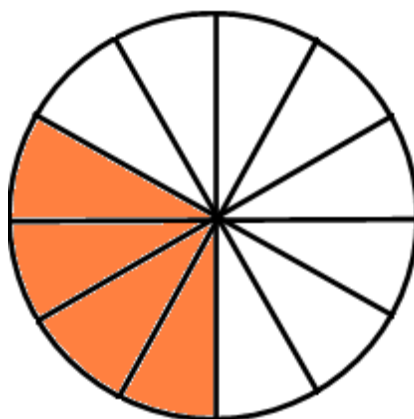
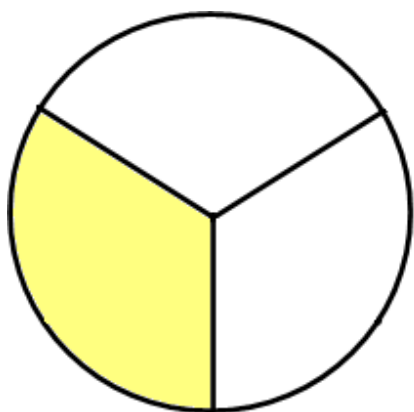
$$\frac{6}{9}$$

$$\frac{16}{24}$$



$$\frac{3}{4}$$

$$\frac{15}{20}$$

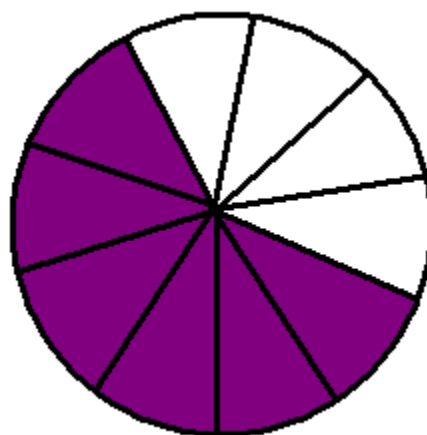
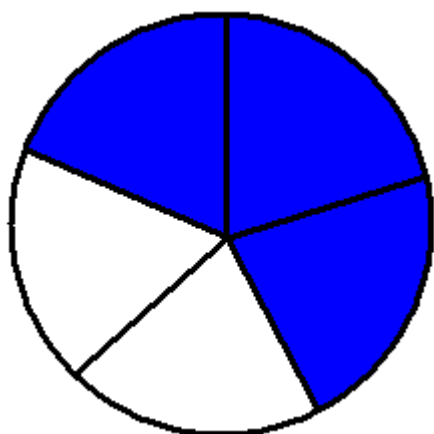
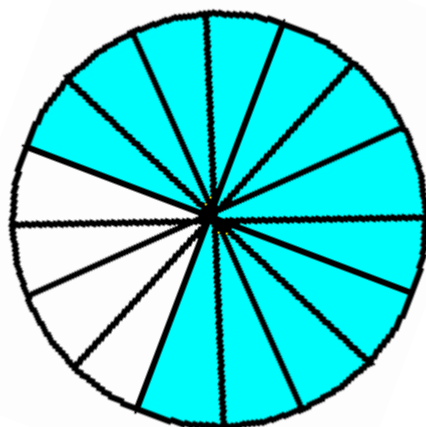
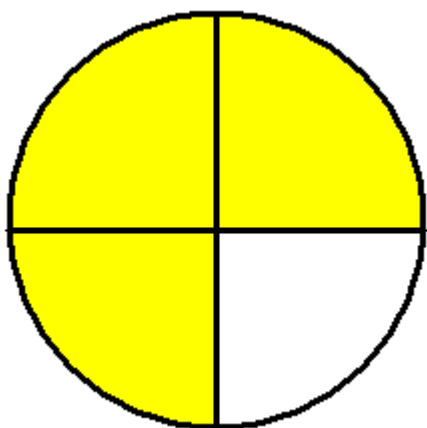


$$\frac{1}{6}$$

$$\frac{4}{24}$$

$$\frac{1}{4}$$

$$\frac{5}{20}$$





$$\frac{3}{5}$$

$$\frac{6}{10}$$

$$\frac{6}{18}$$

$$\frac{14}{42}$$

